

## **REMARKS**

The Examiner is respectfully requested to enter the foregoing amendment prior to examination of the above-identified patent application.

By this Amendment, claim 4 has been amended. Support for the amendment to claim 4 can be found on at least page 24, lines 3 to 5, and Fig. 3 of the original specification of the present application. Accordingly, no new matter has been added.

### **The novelty and non-obviousness of the present invention**

Claim 4, as amended, recites, in part, a condenser that recovers water from the evaporator. A first line that supplies the mixed water-methanol solution from the first mixed water-methanol solution tank to the second mixed water-methanol solution tank. A second line supplies the water from the condenser to the second mixed water-methanol solution tank. A third line supplies the mixed water-methanol solution from the second mixed water-methanol solution tank to the evaporator.

An apparatus for feeding a fuel to a methanol reforming apparatus according to currently amended claim 4 of the present application includes at least the following features (a) to (e).

- (a) The molar ratio of water/methanol in a second mixed water-methanol solution tank is controlled to be at 4.6 or higher.
- (b) The switching means switches which of the first and second mixed water-methanol solution tanks is used as a fuel source according to conditions of operation of the methanol reforming apparatus.
- (c) Mixed water-methanol solution is supplied from the second mixed water-methanol solution tank to the evaporator through the third line when starting and/or stopping the methanol reforming apparatus.

(d) Mixed water-methanol solution is supplied from the first mixed water-methanol solution tank to the second mixed water-methanol solution tank through the first line.

(e) Water recovered by the condenser is supplied to the second mixed water-methanol solution tank through the second line.

The Applicants discovered that quick warming up while preventing a high-rate reaction region can be achieved by controlling the molar ratio of water/methanol to be 4.6 or higher during an initial stage or at a starting point, and thereafter changing the molar ratio of water/methanol to a predetermined value for use in reforming. The Applicants further discovered that the mixed water-methanol solution during an initial stage can be obtained within a system (i.e., without providing an additional supply system for supplying a mixed water-methanol solution for use in starting) by adding water into the mixed water-methanol solution for use in reforming. Thus, the Applicants developed the apparatus of the present invention, which can obtain the following advantages:

(a) Warming up can be performed at the starting point while preventing the high-rate reaction region.

(b) Shorter warming up time.

(c) Easier maintenance since an additional supply system for supplying the mixed water-methanol solution for use in starting is unnecessary.

The Applicants respectfully submit that the cited references do not disclose or suggest the claimed features of the invention, and therefore, do not provide the above-discussed critical and non-obvious advantages provided by the invention.

Claims 4 and 13-20 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Lovercheck (U.S. Patent No. 4,424,771) in view of Negishi (U.S. Patent No. 6,165,633) and Marion et al. (U.S. Patent No. 4,394,137, "Marion"). Lovercheck was cited for disclosing many of the claimed elements of the invention with the exception of use of mixed water-methanol and an electronic control unit that controls the switching means so as to supply the mixed fuel solution from the second mixed water-methanol solution tank to the evaporator when starting and/or stopping the methanol reforming apparatus. Negishi and Marion are cited for curing this deficiency. The Applicants respectfully submit that amended claim 4 and claims 13-20 recite subject matter that is neither disclosed nor suggested by the cited references.

Lovercheck discloses a storage tank 44 that is connected to a liquid-alcohol conduit 4 through line 45. However, Lovercheck does not disclose or suggest at least the combination of features of a first line that supplies the mixed water-methanol solution from the first mixed water-methanol solution tank to the second mixed water-methanol solution tank and a third line that supplies the mixed water-methanol solution from the second mixed water-methanol solution tank to the evaporator, as recited in amended claim 4.

Negishi fails to cure the deficiencies in Lovercheck with respect to claim 4, as Negishi merely discloses that water recovered in the condensate recovery unit 39 is supplied to the water tank 30 via a water recovery conduit 35. However, Negishi does not disclose or suggest at least the combination of features of a first line that supplies the mixed water-methanol solution from the first mixed water-methanol solution tank to

the second mixed water-methanol solution tank and a third line that supplies the mixed water-methanol solution from the second mixed water-methanol solution tank to the evaporator.

Marion does not disclose or suggest the first line, the second line, and the third line recited in amended claim 4. As such, Marion fails to cure the deficiencies in Lovercheck and the combination of Lovercheck and Negishi.

Accordingly, Lovercheck, Negishi, and Marion, both singly or in combination, fail to disclose or suggest the claimed features of the invention, and thereby cannot obtain the critical and non-obvious advantages discussed above.

Claims 10-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lovercheck in view of Negishi and Marion as applied to claim 4 above, and further in view of Beshty et al. (U.S. Patent No. 4,670,359, "Beshty"). Lovercheck, Negishi and Marion were cited for disclosing many of the claimed elements of the invention with the exception of a second mixed water-methanol tank being an S/C control tank in which the molar ratio of water/methanol is controlled by utilizing water in the methanol reforming apparatus. Beshty was cited for curing this deficiency. Claims 10-12 depend from claim 4. The Applicants respectfully submit that claims 10-12 recite subject matter that is neither disclosed nor suggested by the cited references.

As discussed above, Lovercheck, Negishi and Marion do not disclose or suggest at least the combination of features of a condenser that recovers water from the evaporator; a first line that supplies the mixed water-methanol solution from the first mixed water-methanol solution tank to the second mixed water-methanol solution tank; a second line that supplies the water from the condenser to the second mixed water-

methanol solution tank; a third line that supplies the mixed water-methanol solution from the second mixed water-methanol solution tank to the evaporator, as recited in amended claim 4. Beshty fails to cure the deficiencies in the combination of Lovercheck, Negishi and Marion as Beshty also does not disclose or suggest these features. Specifically, Beshty does not disclose or suggest at least the feature of a second mixed water-methanol solution tank connected to the above-mentioned first line, the second line, and the third line as recited in amended claim 4. Accordingly, the combination of Lovercheck, Negishi and Marion and Beshty does not disclose or suggest the features of the invention as recited in amended claim 4, and therefore, dependent claims 10-12.

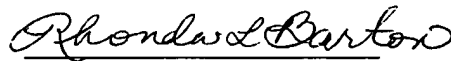
The Applicants further submit that merely recovering and reusing water, as disclosed in Beshty, does not prevent the high-rate reaction region. That is, since reusing the recovered water cannot prevent the high-rate reaction region (i.e., the above-mentioned advantage (a) cannot be obtained), warming up under a reduction atmosphere in which a supply of air is stopped becomes necessary. Such warming up under the reduction atmosphere will need an additional heat source, and thereby require a longer time to warm up (i.e., the above-mentioned advantage (b) cannot be obtained). In order to shorten the time for warming up, an additional apparatus for supplying mixed water-methanol solution having the molar ratio of water/methanol of 4.6 or higher would need to be installed (i.e., the above-mentioned advantage (c) cannot be obtained). Accordingly, combining Beshty with Lovercheck, Negishi and Marion does not teach the claimed features of the present invention or suggest the critical and non-obvious advantages provided thereby.

**Conclusion**

Favorable consideration on the merits is respectfully requested.

Should any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing Attorney Dkt. No. 107439-00049.**

Respectfully submitted,

A handwritten signature in cursive script, reading "Rhonda L. Barton", written in dark ink.

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Enclosures: Request for Continued Examination  
Petition for Extension of Time